भारतीय मानक
Indian Standard

IS 15832 : 2022

पर्यावरणीय प्रभाव संबंधी परिभाषिक शब्दावली प्रलेख

(पहला पुनरीक्षण)

Glossary of Technical Terms Related to Environmental Impact

(First Revision)

ICS 13.020.30

© BIS 2022

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

June 2022 **Price Group 10**

Environment Assessment and Management of Water Resources Projects Sectional Committee, WRD 24

FOREWORD

The Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Environment Assessment and Management of Water Resources Projects Sectional Committee had been approved by the Water Resources Division Council.

A large number of Indian Standards have already been brought out defining technical terms used in water resources projects to avoid ambiguity in their interpretation. Environmental impact and its assessment, has assumed major importance in the planning, design and operation of water resource projects. For clarity and unambiguity in this area, it is essential that the terms used are standardized so that subjective and qualitative communications are clearly understood. To achieve this goal, this standard gives definitions of terms commonly used in the area of environmental impact. There could be some other terms which are not mentioned here. As such the standard should be used for the purpose of providing general guidance and for broad knowledge of the terms. Some of the terms defined here may also have been defined in other Indian Standards, in such cases the definition given in this standard should be construed as the one appropriate to the field of environmental impact.

This standard was first published in 2008 however, the Committee responsible for the formulation of this standard decided to revise it based on the experience gained since then as well as incorporating additional terms related to environmental impact.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

Indian Standard

GLOSSARY OF TECHNICAL TERMS RELATED TO ENVIRONMENTAL IMPACT

(First Revision)

1 SCOPE

This standard covers the definition of terms relating to environmental impact in water resources projects.

2 TERMINOLOGY

A

2.1 Abatement — A reduction in the degree or intensity.

2.2 Abioseston — The non-living components of the seston.

2.3 Abiotic — Absence of life.

2.4 Aboriginal — The original or 'native' inhabitants of an area.

2.5 Abrasion — The wearing a way of surfaces by some mechanical action.

2.6 Absorption — The taking in of fluids or other substance by cells or tissues.

2.7 Abstraction — The removal of water from any ground water source, either permanently or temporarily.

2.8 Abundance — The relative representation in a particular ecosystem.

2.9 Acclimatization — The adjustment of an organism to a new habitat or environment.

2.10 Accretion

a) The process of growth whereby material is added to the outside of non-living matter;
b) The gradual increase in flow of a stream due to influent seepage; and
c) Any process of accumulation by flowing water whether of silt, sand, pebbles, etc.

The difference between accretion and alleviation is that the latter is due to retardation of flow whereas the former may be due to any cause and in fact induces alluviation.

2.11 Acid — Capable of donating hydrogen ions. Solutions of acids have a sour taste, change the colour of litmus paper from blue to red, and neutralize bases.

2.12 Acid Rain — Any type of precipitation with a *p*H below 5.6.

2.13 Acidity of Water — Acidity of water is its quantitative capacity to react with a strong base to a designated ph.

2.14 Adaptation — Adjustment to environmental conditions.

2.15 Adobe — Soil, usually of high clay content, that cracks into roughly cubic blocks when dried.

2.16 Adsorption — Adhesion of molecules to solid surfaces.

2.17 Aedes — A genus of mosquitoes including some 600 species many of which are vectors of disease.

2.18 Aerate — To impregnate with gas, usually air.

2.19 Aeration — The process of adding air to water by physical and/or biological means to aid in purification.

2.20 Aerobe — An organism which requires the presence of free oxygen for respiration.

2.21 Aerobic (Oxybiotic) — Living only in the presence of free oxygen.

2.22 Aerobic Bacteria — Bacteria that require free oxygen and are used in certain types of wastewater treatment processes.

2.23 Aerosol — Particulate matter in the form of dusts, fumes or mist that can remain suspended in the air for long periods of time; usually under 1 micron in diameter.

2.24 Afforestation — Planting of forest cover over denuded land which has no forest or other cover or protection.

2.25 Aggradation — Deposition process in which material get deposited by a river, stream or current".

2.26 Air Pollutant — Any agent, including any physical, chemical, biological, radioactive substance or matter that is emitted into or otherwise enters the ambient air that is harmful to plant or animal life.

2.27 Air Pollution — The presence of substances in the air in a quantity that adversely affect humans, animals, vegetation or materials.

2.28 Algae — Simple, aquatic plants containing chlorophyll.

2.29 Alkaline Water — Water which is high in sodium percent but relatively low in total dissolved salts.

2.30 Alkalinity of Water — Alkalinity of water is a measure of its capacity to neutralize acids.

2.31 Ambient — The natural conditions (or environment) in a given place and time.

2.32 Ambient Standard — Maximum allowable levels of specific polluting materials permitted by law.

2.33 Anaerobe — An organism having ability to grow in the absence of free oxygen.

2.34 Anion — A negatively charged ion.

2.35 Annual Flood — The highest peak discharge during a water year in a stream.

2.36 Anoxic — Pertaining to conditions of oxygen deficiency.

2.37 Aqua — Water related.

2.38 Aquaculture — The use of artificial means to increase the production of aquatic organisms in fresh or salt water.

2.39 Aquatic — Growing in water, not terrestrial.

2.40 Aquiclude — A formation which, although porous and capable of absorbing water, does not permit its movement at rates sufficient to furnish an appreciable supply for a well or spring.

2.41 Aquifer — A formation or a group of formations that contains sufficient permeable material and is saturated to yield sufficient quantities of water to wells and springs.

2.42 Aquifuge — A geological formation which has no interconnected openings and hence cannot absorb or transmit water.

2.43 Arable — Land suitable for cultivation by ploughing or tillage which does not require clearing or other modification.

2.44 Area Velocity Method — A method of measuring discharge at a section in a stream. Cross-sectional area of the stream is measured and velocity of flow is calculated at various depths using some type of instrument. Multiplication of area and mean velocity gives the discharge at that station.

2.45 Artificial Recharge — Artificial recharge is the augmentation of the natural infiltration of precipitation of surface water into underground formation by some method of construction, spreading of water, or by artificially changing natural conditions.

2.46 Assimilation — The ability of a water body to purify itself of pollutants.

2.47 Assimilative Capacity — The maximum pollution load that can be discharged into the environment without affecting its designated use.

2.48 Attenuation — A decrease in the concentration or quantity of a chemical or biological material carried, resulting from a physical, chemical and/or biological reaction occurring in the period considered.

2.49 Average Annual Flood — A flood equal to the average of the annual floods during the period of recording.

2.50 Average Annual Rainfall — Rainfall equal to the average of the annual rainfalls during the period of record.

B

2.51 Background Concentration — The pollutant concentration that would remain if all emissions from all sources that are quantified for use in the modeling or calculation process were fully stopped.

2.52 Background Level — Pollutant levels that are representative of the average conditions in a given area.

2.53 Bacteria — Single celled micro-organisms that lack chlorophyll.

2.54 Base Flow

a) The sustained or dry weather flow of streams resulting from the outflow of permanent or perched groundwater and from the draining of large lakes and swamps.
b) The portion of the stream discharge that is sustained between heavy rainfall events due to delayed pathways.

2.55 Baseline Concentration — The ambient concentration levels of a pollutant.

2.56 Basin — Area drained by a river including all its tributaries.

2.57 Beach — Depositional area at the shore of an ocean or lake covered by mud, sand, gravel, or larger rock fragments and extending into the water for some distance.

2.58 Bed Load — The sediment in almost continuous contact with the bed, carried forward by rolling, sliding or hopping along the bed of the stream. Bed load can be divided into contact load and saltation load.

2.59 Benthic — The bottom of lakes or oceans.

2.60 Benthos — Organisms living in or on the bottom of a water body. Littoral organisms live between 0 to 200 m depth, and deep water organisms at more than 200 m depth.

2.61 Bio–accumulation — The progressive increase in concentration of a chemical in organisms that live in an environment contaminated with low concentrations of the chemical.

2.62 Bio–amplification — *See* Bio-magnification.

2.63 Biochemical Oxygen Demand (BOD) — The amount of oxygen required for the microbial utilization of organics.

2.64 Biocide

a) A biocide is a chemical substance capable of killing different forms of living organisms used in water bodies and fields such as agriculture, forestry and mosquito control.
b) Chemical dusts and sprays applied to crops and to land and water surfaces for the control of agricultural blights, nuisance insects, vectors of human and animal diseases, trash fish, algae, water weeds, and the like.

2.65 Bio–concentration — *See* Bio-magnification

2.66 Biodegradable — It is a substance that can be broken down to simple inorganic substances by the action of bacteria or fungi.

2.67 Biodiversity Index — A factor derived from the number of kinds of organisms per unit area or volume that denotes the extent of diversity in an area.

2.68 Biogas — Gas consisting mainly of methane produced by anaerobic digestion of organic waste.

2.69 Biogeographer — A geographically trained scientist oriented toward spatial description of biotic features usually botanical.

2.70 Biological Clock — An inherent timing mechanism inferred to exist in some living systems in order to explain various cyclical behaviors and physiological processes.

2.71 Biological Degradation — The biochemical process of the breakdown of complex, large organic molecules into small, simple molecules.

2.72 Biological Diversity — The variety inherent in natural biological systems. Three levels of biodiversity usually referred to – genetic diversity, species diversity and ecological diversity.

2.73 Biological Indicator — A living organism that denotes the presence of a specific environmental condition. Such organisms are used to grade environmental quality of an area.

2.74 Biological Mechanisms — The ways used by living organisms to process substances.

2.75 Biological Processes or Biological Systems — Processes characteristics of or resulting from the activities of living organisms.

2.76 Biological Productivity — The amount of matter produced by the unit in question.

2.77 Biological Treatment — A treatment used to remove solids, biodegradable organics and micro organisms from waste water. The processes included biological oxidation.

2.78 Biological Waste — Waste derived from living organisms.

2.79 Biology — The scientific study of living organisms.

2.80 Bio-magnification — Increase in chemical concentration in organisms as a result of passage of chemical through the food chain.

2.81 Biomass — The total mass or amount of living organisms in a particular area or volume.

2.82 Biomass or Standing Crop — The total mass or amount of living organisms in a given population, area or trophic level.

2.83 Biometry — The measurements of biological parameters to the study of living things.

2.84 Biosphere or Ecosphere — That portion of the earth and its atmosphere that can support life.

2.85 Biota — The plant and animal life of a region.

2.86 Biotic — Caused or produced by living organisms.

2.87 Blue Water — Fresh surface and groundwater, in other words, the water in freshwater lakes, rivers and aquifers.

2.88 Borrow Pit — An excavation dug to provide material (borrow) for fill elsewhere.

2.89 Botany — The branch of biology dealing with plants.

2.90 Brackish — Water of salinity 4-25 parts per thousand.

2.91 Brackish Water

a) Water rendered unpalatable due to excessive chloride content.

b) A mixture of sea water and surface run off which occurs, in various proportions, at the lower reaches of streams that debouch into an ocean.

2.92 Braded — Pattern of river bars with numerous interconnected small channels within the general bed of the river.

C

2.93 Canopy — A crown cover provided by shrubs/ trees above ground portion.

2.94 Capillary Pores — Microscopic soil pores that may draw water upwards beyond its natural surface due to surface tension.

2.95 Carbon Count — A measure of the amount of carbon dioxide you produce through your lifestyle every day, for example through driving or using electrical appliances and lighting.

2.96 Carbon Credit — A unit of one tonne of co_2 to reduce greenhouse gas emissions.

2.97 Carbon Footprint — A measure of the impact our activities have on the environment, especially climate change, often reported in the units of tonnes (or kg) of carbon dioxide each of us produces over a given period of time.

2.98 Carbon Offset — A unit, equal to one ton of carbon dioxide, that individuals, companies or governments buy to reduce short-term and long-term emissions of greenhouse gases. The payment usually funds projects that generate energy from renewable sources such as wind or flowing water. Individuals can choose whether to buy an offset (for example to compensate for air travel), but governments and large industries are sometimes required to buy them to meet international targets aimed at reducing greenhouse gases.

2.99 Carbon Tax — A tax on fuels according to their carbon content, which aims to encourage people and businesses to use fuels with less carbon and reduce the amount of energy they use.

2.100 Carcinogenic — Capable of producing cancer.

2.101 Carnivore — An animal or plant that feeds on animals.

2.102 Carrier — An infected person (or animal) that harbours a specific pathogen in the absence of discernible clinical disease and serves as a potential source of infection for other person or animal.

2.103 Catchment Area — The area from which a lake, stream or waterway and reservoir receives surface flow which originates as precipitation.

2.104 Catchment Area Treatment (CAT) — The catchment area treatment (CAT) plan pertains to preparation of a management plan for treatment of erosion prone area of the catchment through biological and engineering measures. A comprehensive CAT plan should also include the social dimensions associated directly or indirectly with the catchment.

2.105 Cation — A positively charged ion.

2.106 Channel — A natural or artificial watercourse of perceptible extent with a definite bed and banks to confine and conduct continuously or periodically flowing water.

2.107 Chlorofluorocarbon (CFCs) — An organic compound that contains carbon, chlorine, hydrogen and fluorine, produced as a volatile. Halo derivatives of saturated hydro carbons such as methane or ethane. Many CFCs have been widely used as refrigerants, propellants (in aerosol applications), and solvents. CFC's contribute to ozone depletion in the upper atmosphere.

2.108 Channel Rugosity — A measure of the roughness of the surface of channel in which water flows.

2.109 Channelization — Alteration of course of a stream to modify flow characteristic of water.

2.110 Char — Large carbon particles.

2.111 Check Dam — A small low fixed dam, constructed of brush, logs, timber, loose rock, masonry or concrete in an eroded channel to reduce the slope of the water flowing therein during high stages, and also the resulting velocity thereby preventing excessive scour and erosion and inducing deposition. Such dams are also used 'to retain debris. They are usually built of inexpensive and temporary materials where dependence for ultimate protection is placed on vegetative cover.

2.112 Chemical Oxygen Demand — A measure of the oxygen equivalent which is required for the oxidation through chemical process of an organically polluted water supply.

2.113 Chlorination — The use of chlorine for the treatment of water, sewage or industrial wastes for disinfection or oxidation.

2.114 Chlorophyll — The green pigment in plants responsible for photosynthesis.

2.115 Climate — The average conditions of the weather over a number of years.

2.116 Climate Change — Climate change refers to any change in climate over time either due to natural variability or due to human activities. However, according to United Nations Framework Convention on Climate Change (UNFCCC), the climate change is defined as ‘a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods’.

2.117 Closed Lake — A lake that does not have a drainage outlet.

2.118 Cloud Burst — A cloudburst is an extreme amount of precipitation, sometimes with hail and thunder, which normally lasts no longer than a few minutes but is capable of creating flood conditions (A rain fall rate equal to or greater than 100 mm per hour). The term cloudburst may be used to describe any sudden heavy, brief, and usually un-forecasted rainfall.

2.119 Coastal Zone — Ocean water and adjacent land of the sea and its ecology.

2.120 Coliform — A general term for the group of bacteria that comprise all of the aerobic and facultative anaerobic, gram negative (type of stain related to cell wall composition), nonspore forming, rod shaped bacteria which ferment lactose (milk sugar) with gas formation within 48 hours at 35 °C (95 °F) Examples; Escherichia, Citrobacter, Klebsiella (*See* Faecal, Coliform, Indicator Organisms (Fecal).

2.121 Coliform, Faecal — Bacteria found in human and animals faeces. A high coliform count indicates potential contamination of a water supply by human waste and the potential to cause disease.

2.122 Colony — A group of plants or animals living together.

2.123 Compost — The humus–like product of the aerobic or anaerobic composting of either night soil or sludge mixed with organic material rich in carbon (such as refuse or sawdust).

2.124 Concentration — Amount of any matter contained in liquid usually expressed in mass of that matter per unit volume of liquid.

2.125 Conductivity

a) The ability of water to conduct an electrical current, which is dependent on the concentration of ionized solids in the water.
b) The reciprocal of electrical resistivity of a water sample with 1 square cm cross section and 1 cm long, often expressed as “reciprocal ohms” or mhos per centimeter.

2.126 Confluence — Joining or the place of junction of two or more streams.

2.127 Conifers — Cone bearing trees or shrubs. Mostly evergreens such as pine, cedar, spruce, etc.

2.128 Conjunctive Use — Conjunctive use involves the coordinated and planned use of both, surface water and groundwater, resources to meet water requirements for optimum utilization of water resources.

2.129 Consumptive Use — The quantity of water consumed in evaporation transpiration and metabolic processes during crop growth, including water consumed by accompanying weed growth. It is expressed in water-depth units per unit area, also called Consumptive Water Use or Evapotranspiration.

2.130 Contaminant — Any physical, chemical, biological or radiological substance not normally present in the environment, or found at unusually high concentrations in water or soil.

2.131 Contamination — A process in which the chemical composition of any substance changes due to a contaminant and makes the substance unsuitable for its intended use.

2.132 Contiguous — In actual contact with; also, near or adjacent to.

2.133 Correlation — Measure of inter dependence between two variables.

2.134 Correlation Coefficient — A number or function that indicates the degree of correlation between two sets of data or between two random variables and that is equal to their covariance divided by the product of their standard deviations.

2.135 Corridor

a) A narrow strip of land reserved for specific purpose such as location of transmission lines, pipelines and service roads.
b) An area through which species can move from one place to another over time in response to changes in environmental or as natural parts of their life history.

2.136 Critical — A condition, measurement, or point at which some quality, property, or phenomenon suffers a definite change.

2.137 Critical Concentration — The level of concentration of an impurity in water above which its use for specific purpose, such as drinking, industrial and agriculture gets adversely affected.

2.138 Critical Pollutant — The pollutant or pollutant combination with the highest sub index during the reporting period.

2.139 Crop Rotation — The practice of alternating crop types to maintain fertility levels, improve soil condition and avoid insect or disease infestations, etc.

2.140 Cropland — Land regularly used for production of crops.

2.141 Cross–section — Section of a stream having levels of bed and banks at right angle to the main (average) direction of flow.

D

2.142 Dam — A barrier constructed across a river or natural watercourse for the purpose of,

a) Impounding water or creating reservoir;
b) Diverting water there from into a conduit or channel for power generation and/or irrigation purposes;
c) Creating a head which can be used for power generation;
d) Improving river navigability;
e) Retention of debris;
f) Flood control;
g) Domestic, municipal and industrial uses;
h) Preservation of wildlife and pisciculture; and
j) Recreation, etc.

2.143 Data Base — Comprehensive set of related data files for a specific application.

2.144 Data Processing — Handling of observational data until they are in a form ready to be used for a specific purpose.

2.145 Dead Storage — Storage of a reservoir. Below the bottom of its lowest outlet which generally cannot be released through gravity.

2.146 Decay Rate — The rate or reduction of the concentration of a quantity expressed by its half life.

2.147 Deciduous — Falling off at one end of a growing period (season) or at maturity as with some leaves, antlers, insect wings, etc. It is a commonly used term to distinguish trees that shed their leaves as opposed to evergreens which retain their leaves.

2.148 Decomposers — Organisms such as fungi and bacteria that break down complex compounds into their constituent units. They are also known as reducers.

2.149 Deep Seepage — Downwards water movement in the soil (and rocks) beyond the range of most plant roots.

2.150 Deep Well Disposal — The disposal of raw or treated, filtered hazardous waste by pumping it into deep wells.

2.151 Deforestation — The permanent removal of forest and undergrowth.

2.152 Degradation — The morphological process wherein streambeds and flood plains are lowered in elevation for gradual erosion of bed natural. The opposite of aggradation.

2.153 Dendritic — Channel patterns of streams with tributaries that branch to form a tree like pattern.

2.154 Density — Mass per unit volume of any matter.

2.155 Depletion — Continuous or sporadic withdrawal of water from a surface stream of ground water, or reservoir or basin at a rate greater than the rate of replenishment.

2.156 Desalinization/Desalting — Removing salt from ocean water or brackish water.

2.157 Desert — A large area of land that has very little water and very few plants growing on it.

2.158 Desert Crust — A hard layer containing calcium carbonate, gypsum or other binding material exposed at the surface in desert regions.

2.159 Desertification — The process of development of desert conditions.

2.160 Detention Dam — A dam built to store streamflow or surface runoff and to control the release of such stored water.

2.161 Detention Tank — A tank used in water or wastewater treatment to provide adequate time for chemical or physical reactions to take place in the body of water being treated.

2.162 Dilution Factor — The number of times that a polluted effluent volume has to be diluted with ambient water in order to arrive at the maximum acceptable concentration level.

2.163 Dioxins — Highly toxic chemicals that can be formed in small amounts from forest fires or volcanoes but more often are produced unintentionally from industrial activities and from incinerating waste and burning fossil fuels.

2.164 Discharge — Volume of water flowing in a given stream at a given time usually expressed in cubic meter per second or cubic foot per second.

2.165 Disease — A particular destructive process in an organism with a specific cause and characteristic symptoms.

2.166 Disinfectant — An agent, such as heat, radiation, or a chemical, that destroys, neutralizes, or inhibits the growth of disease carrying microorganisms.

2.167 Disinfection — A chemical or physical process that kills organisms causing infectious diseases.

2.168 Disposal Well — A well used for the disposal of waste into a subsurface stratum.

2.169 Dissolved Oxygen (DO)

a) Amount of oxygen needed for the respiration of the micro-organisms responsible for aerobic decomposition of organic matter and for plants and animals that are engaged in resynthesizing organic matter.
b) Amount of oxygen required to oxidize unstable materials and for aquatic life to survive.

2.170 Dissolved Solids — The total amount of dissolved material, organic and inorganic, contained in water and wastewater.

2.171 Ditch — An open waterway that collects and/or conveys drainage water.

2.172 Diurnal — Occurring every day.

2.173 Diversion Dam — A structure built across a stream to divert water.

2.174 Diversity — A measure of the relative abundance of species and their populations in an ecosystem.

2.175 Domestic Effluents/Domestic Wastes/Domestic Waste Water — *See* Domestic Sewage in **2.176**.

2.176 Domestic Sewage — Wastes consisting of human bodily discharges carried by flushing water, sludge water from kitchens, bathrooms and laundries; and, other waterborne material discarded as a result of regular household and human sanitary activities.

2.177 Drainage Density — Drainage density is the total length of all the streams and rivers in a drainage basin divided by the total area of the drainage basin. It is a measure of how well or how poorly a watershed is drained by stream channels.

2.178 Draw Down — The reduction in static head within the aquifer resulting from abstraction.

2.179 Dredging — To remove earth/sediment from water bodies/streams.

2.180 Drought — Drought is an extended period of months or years when a region notes a deficiency in its water supply whether surface or underground water. Generally, this occurs when a region receives consistently below average precipitation. The types of droughts are:

a) meteorological drought,
b) agricultural drought and
c) hydrological drought.

It can have a substantial impact on the ecosystem and agriculture of the affected region.

2.181 Dry Farming — Agriculture practiced on non-irrigated land and dependent upon natural precipitation and its retention and distribution.

E

2.182 Ecological Balance — A state of equilibrium in a natural community, as indicated by the relative numbers of the components of the community remaining more or less constant, thus forming a stable eco–system.

2.183 Ecology — That branch of the biological sciences which deals with the relationships between living organisms and their environment.

2.184 Ecosystem — A complex system composed of a community of fauna and flora, taking into account the chemical and physical environment with which the system is interrelated.

2.185 Effective Precipitation

a) Part of the rain that appears as run off in the stream;
b) In agricultural practice, that portion of total precipitation which is retained by the soil so that it is available for use for crop production; and
c) The portion of precipitation that is becoming available for evapotranspiration and will be able to satisfy evapotranspirative demand.

2.186 Effective Soil Depth — The depth of soil material that plant roots can penetrate readily to obtain water and plant nutrient. The depth to a layer that differs sufficiently from the overlying material in physical or chemical properties to prevent or seriously retard the growth of roots.

2.187 Effluent

a) A liquid which flows out of a containing space.
b) Sewage, water or other liquid, partially or completely treated, or in its natural state, as the case may be, flowing out of a reservoir, basin, or treatment plant or part thereof.
c) Stream flowing out of another stream or lake.
d) Stream fed by ground water.

2.188 Effluent Standard — The maximum amount of specified pollutants allowed in discharged sewage as established by regulating agencies to achieve desirable stream standards.

2.189 EIS / EIA — Environmental Impact Statement *I* Environmental Impact Assessment.

2.190 Electrical Conductivity — Electrical conductivity or specific conductance is the reciprocal of the electrical resistivity. It measures a material’s ability to conduct an electric current. It is expressed in mhos/cm.

2.191 Electrical Resistivity — The electrical resistivity is the resistance in ohms of a conductor, metal, or electrolyte, which is one centimeter long and has a cross section area of 1 sq. cm. It is expressed in ohm-cm.

2.192 Electrodialysis — A process that uses electrical current applied to permeable membranes to remove mineral from water. Often used to desalinize salt or brackish water.

2.193 Electrolyte — A substance that dissociates into two or more ions when dissolved in water.

2.194 Emission — A discharge of pollutants (generally gaseous air pollutants) into the atmosphere, usually as a result of burning or the operation of internal combustion engines. Like "effluent" but used in regard to air pollution.

2.195 Endemic — A species restricted to a given geographic location or a native species to a given locale.

2.196 Engineering Hydrology — That branch of applied hydrology which deals with engineering applications like hydrological observations, planning, designing, operating and maintaining engineering structures and engineering measures.

2.197 Enhancement Flow — An improvement of flow that results in better stream conditions for aquatic, terrestrial and other resources.

2.198 Environment — It includes water, air and land and inter-relation which exist between these and human beings including other living creatures, plants, micro-organisms and property.

2.199 Environmental Agents — External influences and conditions (particularly physical, biological, and man made) and natural chemical substances found in the environment.

2.200 Environmental Appraisal — A formal document based on environmental impact analyses, which supports affected environment, alternatives including proposed action, statement of purpose and need and environmental consequences.

2.201 Environmental Assessment — The critical appraisal of the likely positive and negative effects of a proposed project, activity, or policy on the environment.

2.202 Environmental Auditor — A professional who approves legal environmental compliance for an organization.

2.203 Environmental Criteria — Standards of physical, chemical and biological components that define the given quality of an environment.

2.204 Environmental Economics — A market based approach to achieving a sustainable economy that integrates long term economic growth, environmental quality and social fairness through innovative taxes, tax incentives, auctioned permits and other market based mechanisms.

2.205 Environmental Effect — Effect of natural or man made actions which alter the environment as measured by physical, chemical and biological parameters.

2.206 Environmental Elements — Any of the biological, physical or chemical condition within a defined geographic area that might be affected by a proposed human activity.

2.207 Environmental Engineer — A person with technical engineering skills who utilizes systems or ecosystems concepts and guidelines for construction or design purposes. Space engineering, sanitary engineering, some aspects of civil engineering, public health engineering, noise control, risk assessment, and pollution abatement activities are covered under this title.

2.208 Environmental Flow — The amount of river flow that needs to be maintained downstream of the dam in order to maintain specified valued features of the river ecosystem.

2.209 Environmental Impact

a) An effect on an environmental resources or value resulting from human activities.
b) An effect of any kind of any components or the whole of the environment. Assessment of the impact generally involves two major elements a quantitative measure of magnitude and a qualitative measure of importance.

2.210 Environmental Impact Assessment — A more or less formal consideration of the interaction of a proposed human activity with environmental elements that might be affected by the activity. Includes a determination of the probable effect of the activity on social and economic conditions.

2.211 Environmental Impact Statement — Document describing a proposed project, its probable environmental impacts and alternatives to the proposed project and associated environmental impacts.

2.212 Environmental Manager — A system oriented professional who coordinates social, administrative, political, legal, and economic concerns relating to ecosystem management.

2.213 Environmental Monitoring

a) The systematic measuring of various components, constituting the environment.

b) The monitoring of implementation of the environmental safeguards stipulated by the concerned agencies while according clearance to a project.

2.214 Environmental Parameters — Physical, chemical, or biological components and their interactions that can be stated in quantitative terms.

2.215 Environmental Planner — An environmental planner putting his or her knowledge of the ecosystem into a planning process or predictive frame of reference to effect a better fit between the works of humans and nature. This type of planning is a paper exercise that begins a development process, a government process, or policy formulation process, environmental planning includes goal setting, information analysis, hearings and approvals.

2.216 Environmental Planning — Planning activities with the objective of preserving or enhancing environmental values or resources.

2.217 Environmental Quality Standard — The maximum limits or concentrations of pollutants permitted in specified media.

2.218 Environmental Review — A formal evaluation undertaken to determine whether a proposed action may have a significant impact on the environment.

2.219 Environmental Scientist — A person studying the interactions between the physical, chemical, and biological components of the environment, including their effects on all types of organisms but more often the human impact on the environment.

2.220 Environmental Standards — Standards set to protect human health and well being; environmental sustainability and aesthetics, and the well being of plant and animal life.

2.221 Environmental Surveillance — A program to monitor the impact on the surrounding region of the discharges from industrial operations.

2.222 Ephemeral

a) A stream or portion of a stream which flows only in direct response to precipitation.

b) Small desert plants that complete a life cycle very rapidly following a desert downpour.

2.223 Epidemic — Epidemic occurs when new cases of a certain disease, in a given human population, and during a given period, substantially exceed what is expected based on recent experience. Epidemics of infectious disease are generally caused by a change in the ecology of the host population (for example, increased stress or increase in the density of a vector species), a genetic change in the parasite population or the introduction of a new parasite to a host population (by movement of parasites or hosts).

2.224 Epilimnion — The warm superficial layer of a lake between the surface and a horizontal plane marked by the maximum gradient of temperature and density change.

2.225 Erode — To wear away or remove the land surface by wind, water or other agents.

2.226 Estuary — Areas where fresh water meets salt water. These brackish water ecosystems shelter and feed wildlife, birds and marine life.

2.227 Eutrophic Lakes — Lake or other contained water body, rich in nutrients. Characterized by a large quantity of planktonic algae, low water transparency with high dissolved oxygen in the upper layer, zero dissolved oxygen in deep layers during summer months, and large organic deposits, coloured brown to black.

2.228 Eutrophication

a) Eutrophication of any aquatic ecosystem is a multifaceted term associated with increased productivity, simplification of biotic communities and a reduction in the ability of the metabolism of the organisms to adapt to the imposed loading of nutrients.

b) Nutrient enrichment of lakes, ponds and other such waters that stimulates the growth of aquatic organisms that leads to a deficiency of oxygen in water body.

2.229 Evergreen — A tree or shrub that had green leaves throughout the year.

2.230 Evolution — The cumulative change in the characteristics of populations or organisms occurring over the course of successive generations related by descent.

2.231 Excess Rainfall — The difference over a period of time between the gains of water due to rainfall etc. and losses due to infiltration, evapotranspiration from the soil.

2.232 Excessive Drainage — Rapid drainage of gravitational water such that plants suffer from stresses due to insufficient water in any dry season. Usually this occurs on sandy or gravelly soil profiles with large soil particles and large inter grain spaces.

2.233 Excretion — The discharge of metabolic wastes.

2.234 External Drainage — The movement of water across the surface of the land to outlets such as natural stream channels or waterways.

2.235 Extinct Lake — A lake that has lost all of its water permanently, and when surface exposure of the water no longer exists.

F

2.236 Fallow — Cropland left idle in order to restore productivity mainly through accumulation of nutrients, water and organic matter.

2.237 Fauna — All animal life associated with a given habitat, ecosystem, region or period.

2.238 Fertilizer — Any organic or inorganic material of natural or synthetic origin that is added to a soil to supply elements essential to plant growth.

2.239 Field Capacity — The water content of a soil after excess water has just finished draining by gravity.

2.240 Filter Dam — A pervious dam of loose stones, etc, at the inlet outlet of a lake to prevent fish from entering or leaving.

2.241 Filtration — Removing particles from water by passing it through a filtering medium.

2.242 Firm Water Supply — An assured minimum supply of water under the most adverse water year supply conditions.

2.243 Floc — A flocculent mass formed in a fluid through precipitation or aggregation of suspended particles with coagulant.

2.244 Flocculation

a) A condition in which clays, polymers or other small charged particles become attached and form a floc. In dispersed clay slurries, flocculation occurs after mechanical agitation ceases and the dispersed clay platelets spontaneously form flocs because of attractions between negative face charges and positive edge charges.

b) A condition in which non settleable suspended matters and some dissolved solids are converted into settleable solids and becomes amenable to sedimentation by aggregation and precipitation with chemicals/coagulants.

2.245 Flood — It is a body of water which rises temporarily to overflow into land which is not normally submerged or, to flow in the river channel. Floods have two essential characteristics: the inundating of land within or outside the flow channel is temporary, and the land is contiguous to the flood axis.

2.246 Flood Plain

a) It includes the water channel, the flood channel and that area of nearby low land susceptible to flood by inundation.

b) Adjoining land at the bottom of a valley of a stream flooded only when the stream flow exceeds the bank-full stage.

2.247 Flora — All plant life associated with a given habitat, country, or period. Bacteria are considered flora.

2.248 Flow — The volume of water passing a given point per unit of time.

2.249 Flushing Period — The time required for the water of a water body to be completely replaced.

2.250 Food Chain — The step by step transfer of food energy and materials, by consumption, from the primary source in plants through increasingly higher forms of animals.

2.251 Food Cycle or Food Web — All the interconnecting food chains in a community.

2.252 Foreshore — A strip of land on the margin of a body of water, for example, a lake or stream which is intermittently exposed when the water level fluctuates.

2.253 Forester — A professional trained in the planning and management of timber crops.

2.254 Fossil Fuels — Remains of ancient plant and animal life consumed to produce energy like Coal, oil and natural gas.

2.255 Free Drainage — Movement of water by gravity, through and below the root zone. Such water is only available for plant use while passing through the root zone.

2.256 Freeboard — The difference in elevation between the maximum reservoir water surface and the dam crest.

2.257 Freshwater — Water with salinity less than 500 parts per million (ppm).

2.258 Freshwater Lake — Any inland pond, reservoir, impoundment or other similar body of water that exhibits no anthropogenic sources of nutrients, oceanic and tidal influences and that has high biodiversity and low plant growth with TDS concentration of less than 10000 ppm.

2.259 Fungi — Tiny plants that lack chlorophyll. Some cause disease, others stabilise sewage and break down solid wastes for compost.

G

2.260 Geographical Information System (GIS) — Geographical Information Systems (GIS) are computerized resource data base systems that are referenced to some geographic coordinate system. A GIS is primarily used to store, manipulate, analyze and display various spatial data. In addition, GIS combine special hardware and software to perform numerous functions and operations on various spatial data layers residing in the database.

2.261 Geology — Geology is the science comprising the study of solid earth, the rocks of which it is composed, and the processes by which they change.

2.262 Geomorphology — Geomorphology is the scientific study of landforms and the processes that shape them.

2.263 Global Warming — An increase in the average temperature of the earth's atmosphere, especially a sustained increase sufficient to cause climatic change, caused due to an increase in concentration of carbon dioxide and other greenhouse gases in the atmosphere.

2.264 Gradient — The general slope or rate of change in vertical elevation per unit of horizontal distance.

2.265 Green Water — The precipitation on land that does not run off or recharge the groundwater but is stored in the soil or temporarily stays on top of the soil or vegetation. Eventually, this part of precipitation evaporates or transpires through plants. Green water can be made productive for crop growth (although not all green water can be taken up by crops, because there will always be evaporation from the soil and because not all periods of the year or areas are suitable for crop growth).

2.266 Greenhouse Effect — The warming of the atmosphere by the trapping of long wave radiation being radiated to space by greenhouse gases.

2.267 Greenhouse Gases — Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelength within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere.

2.268 Grey Water — Grey water is wastewater generated from domestic activities such as laundry, dishwashing, and bathing, which can be recycled on-site for uses such as landscape irrigation and constructed wetlands. Grey water differs from water from the toilets which is designated sewage or black water to indicate it contains human waste.

2.269 Groundwater Contamination — The pollution of springs and wells. It can result from indiscriminate land disposal of potentially hazardous waste materials that are then dissolved or suspended in free liquids, usually water, and leached downward through the unsaturated profile to the zone of saturation or from improperly constructed or operated wells.

H

2.270 Habitat — The area or environment where an organism or ecological community normally lives or occurs.

2.271 Half Life — The time required for the decay or disappearance of half of a substance that decays in a regular, exponential way.

2.272 Hard Water — Alkaline water containing high amounts of dissolved mineral salts (mainly bicarbonates, chlorides and sulphates of calcium and magnesium) that interfere with some industrial processes and prevent soap from lathering.

2.273 Hardness — A measure of calcium, iron and magnesium salts (carbonates, nitrates, sulphates, chlorides, etc) expressed as parts of equivalent calcium carbonate per million parts of water or mg/l.

2.274 Hazard — A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

2.275 Hazardous Substance — Substance which has the potential, though being used at work, to harm the health or safety of persons in the workplace.

2.276 Hazardous Waste — It means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances.

2.277 Hazardous Waste Management — The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous wastes.

2.278 Head Loss — The difference in level of the groundwater table in different parts of the same aquifer resulting from resistance to ground flow through the aquifer.

2.279 Headworks — Structure for diverting water into the head of a channel.

2.280 Heavy Metals — Metals with a density of greater than 5 g cm^{-3}.

2.281 Heterogeneous — Not from the same source, individual, or species.

2.282 Heterotrophic — An organism that obtains nourishment from the ingestion and breakdown of organic matter being incapable of synthesizing the required organic materials from inorganic sources.

2.283 Holomistic Lake — A lake with complete circulation (mixing).

2.284 Homeothermic (Homoiothermic) – Warm blooded. Maintaining a relatively constant body temperature regardless of the temperature of the environment.

2.285 Homing — The return of animal species to their spawning or breeding grounds.

2.286 Homochromous — Alike in colour.

2.287 Homogenous — Composed of similar or identical parts; uniform.

2.288 Homomorphic — Uniform shape and size.

2.289 Host — An organism that harbors a parasite, mutual partner, or commensal partner, typically providing nourishment and shelter.

2.290 Humidity — Humidity is the amount of water vapor in the air. Humidity indicates the likelihood of precipitation, dew, or fog. There are three main measurements of humidity:

a) absolute,
b) relative, and
c) specific.

Absolute humidity is the water content of air. Relative humidity, expressed as a percent, measures the current, absolute humidity related to the maximum for that air pressure and temperature. Specific humidity is a ratio of the water vapor content of the mixture to the total air content on a mass basis.

2.291 Humus — Partially decomposed organic material found in soil and water.

2.292 Hybrid — An organism resulting from a cross breeding between parents of different genotypes.

2.293 Hydraulic Conductivity — The rate of flow of water in litres/day through unit cross-section of soil under unit hydraulic gradient at a specified temperature.

2.294 Hydraulic Gradient

a) The change in hydraulic head of the aquifer per unit distance in the direction of flow; or
b) The slope of the line of piezometric head (that is, sum of the pressure and elevation heads) at any point in the flow path.

2.295 Hydraulic Head — It is the height of piezometric surface (for confined aquifer) or water table (for unconfined aquifer) at a particular location above a datum.

2.296 Hydrobiology — The scientific study of life in water environments.

2.297 Hydrobiont — A discrete unit of aquatic living matter.

2.298 Hydrocarbons in Air — Generally unburned petroleum products which serve as reductant precursors in the formation of photochemical smog.

2.299 Hydrocoenosis — A community of organisms inhabiting an aquatic biotope.

2.300 Hydroelectric Plant — An electric power plant using falling water as its motive force.

2.301 Hydrogenation — The addition of hydrogen to a compound.

2.302 Hydrogeology — A branch of earth sciences dealing with the subsurface distribution of rock formations and their ability to receive, store and transmit water.

2.303 Hydrograph — A graph showing the stage, volume of flow, velocity, sediment concentration or sediment discharge or some other feature of flowing water with respect to time at a given place.

2.304 Hydrologic Cycle

a) The cycle of water movement from the atmosphere to the earth by precipitation and its return to the atmosphere by interception, evaporation, runoff, infiltration, percolation, storage and transpiration.
b) The continuous circulation of water from the atmosphere through soil to ocean to atmosphere (inter-relationships between precipitation, evaporation, groundwater supplies, and water in general).

2.305 Hydrology — Science of water dealing with occurrence, circulation and distribution of water of earth and earth's atmosphere.

2.306 Hydrolysis — The reaction of a compound with water resulting in the production of a weak acid and a weak base.

2.307 Hydrophyte — A plant whose habitat is water or very wet places.

2.308 Hypolimnion — Colder bottom water zone of a stratified lake, extending from the thermocline to the bottom.

2.309 Hypoorheos — The saturated zone beneath a river or stream consisting of substrate such as sand, gravel and rock with water filled interstitial pore. The zone often extends beyond the width of the stream channel and is typically used by certain aquatic organisms during their normal life cycle and as a refuge.

2.310 Hypothesis — A proposition, condition, or principle which is assumed to explain certain facts and guide in the investigations of others.

I

2.311 Ichthyology — The scientific study of fish.

2.312 Immigration — The movement of an animal into an area not previously occupied by that animal.

2.313 Impervious Material — Refers to relatively waterproof soils such as clay through which water will percolate at about one millionth of the rate at which it will pass through gravel.

2.314 Impervious Soil — A soil through which water, air, or roots can not penetrate. No soil is impervious to water and air all the time.

2.315 Impingement — Striking or dashing against; to be forced against a screen (fish) by water pressure so that escape is impossible.

2.316 Impurity — A chemical substance that is unintentionally present with another chemical substance or mixture.

2.317 Inbreeding — The mating of closely related individuals.

2.318 Incidence Rate — The number of newly diagnosed or reported cases of the specified disease during a defined period of time divided by the population in which the disease occurred.

2.319 Incinerator — A furnace that is designed to burn waste at very high temperatures under controlled conditions and is licensed by national regulatory authorities. Most modern and efficient incinerator generates heat and energy from burning waste.

2.320 Indicator Organism (Faecal) — An organism that, while not pathogenic itself, indicates the possible presence of a pathogenic species (*See* Coliform).

2.321 Indigenous — A species that is native to a given area.

2.322 Industrial Effluent — The water and air borne wastes of industry.

2.323 Industrial Waste — Any solid, semi-solid or liquid waste generated by a manufacturing or processing plant.

2.324 Industrial Wastewater — The used water from industrial operation, which may be treated and reused at the plant, discharged to the municipal sewer, or discharged directly to surface waters untreated or partially treated.

2.325 Infauna — Part of the burrowing benthos population.

2.326 Infectious Disease (Water Related) — Caused by a pathogenic organism and can, therefore, be passed from one person to another. A person may be infected with a pathogen without suffering the symptoms of the disease.

2.327 Influent

a) Sewage, water, or other liquid, raw or partly treated; flowing into a reservoir, basin, or treatment plant, or part thereof.
b) A stream flowing into a lake.

2.328 Ingest — To take a substance from the outside into the digestive tract.

2.329 Injection Wells — A device used to deposit materials into the soil by means of pressure.

2.330 Insecticide — All substances or mixtures of substances intended for preventing or inhibiting the establishment, reproduction, development or growth of, destroying or repelling any insect declared to be a pest.

2.331 Insectivorous — Organisms which consume insects as a primary food source.

2.332 *In-situ* — In its original position or place.

2.333 Insolation — The rate at which radiant energy is incident directly from the sun per unit horizontal area at any place on or above the surface of the earth.

2.334 Instar — A state in the life cycle of an insect or other arthropod between two successive molts.

2.335 Instream Flow Requirement — Water that remains within the river ecosystem is not withdrawn for use elsewhere outside the river ecosystem.

2.336 Interception — The process by which precipitation is retained by vegetation before it reaches the ground.

2.337 Interceptor Ditches — Open channels excavated across the general slope of the land, along the upper margin of the area to be protected, to divert all flows at or near the surface.

2.338 Interceptor Drains — Installed to control horizontal or upwards ground flow.

2.339 Interflow — Lateral movement of water through topsoil when infiltration rate exceeds percolation rate.

2.340 Interfluve — A ridge between river valleys.

2.341 Intermittent (Stream) — Flowing at intervals, recurrent, periodic.

2.342 Intermittent Saturation Zone — The zone between the highest and lowest levels of the groundwater table as it responds to seasonal and short term weather changes.

2.343 Internal Drainage — The movement of water down through the soil profile to porous aquifers or to surface.

2.344 Interspecific — Relations between species.

2.345 Interstitial Flow — The portion of the surface water that infiltrates the streambed and moves through pores in the subsurface.

2.346 Intraspecific — Relations between individuals within a species.

2.347 Inundate — To cover with impounded waters or floodwaters.

2.348 Invader Plant Species — Species, often annuals, which are not a part of the climax vegetation.

2.349 Invertebrates — Literally, all animals without a vertebral column.

2.350 In Vitro — Biological reaction taking place in an artificial apparatus.

2.351 In Vivo — Biological reaction taking place in a living cell or organism.

2.352 Ions — An electrically charged atom or group of atoms in aquatic solutions.

2.353 Irretrievable — Not retrievable. A natural resource (water course, fishery, wetland, wildlife habitat, etc.) which would be lost forever due to the implementation of a project action.

2.354 Irreversible — Incapable of being reversed. A natural process or operation (migration pattern, landscape, fish and wildlife habitat, etc.) which would never occur again because of the implementation of a project action.

2.355 Irrigation — The supply of water by artificial means for raising crops.

2.356 Irrigation Return Flow — Surface water, other than navigable waters, containing pollutants that result from the controlled application of water by any person to land used primarily for crops, forage growth or nursery operations.

2.357 Irruption — A sudden or dramatic increase in a given wildlife population.

L

2.358 Lacustrine — Living in lakes or pertaining to lake environment.

2.359 Lagoon

a) An oxidation pond in which wastewater is purified through sedimentation, and both aerobic and anaerobic biochemical action over a period of time.

b) A shallow area of water generally separated from a large body of water by a partial barrier.

2.360 Lake — A large body of water contained in a depression of the earth's surface and supplied from drainage of a larger area.

2.361 Land Drainage — Removal of excess, superfluous or gravitational water from land surface to prevent or to relieve waterlogging, the accumulation of harmful amounts of salts and deterioration of soil structure.

2.362 Land Drains — Drains that remove excess soil water from the profile to control a high groundwater table or a perched water table. Set at regular intervals across the land. Also called minor drains or lateral drains.

2.363 Land Reclamation — Making land capable of more intensive use by changing its general characters, as by drainage of excessively wet land; irrigation of arid or semi arid land; or recovery of submerged land from seas, lakes, and rivers.

2.364 Land Use Planner — A person coming from academic planning, geography, biological sciences, forestry, or environmental studies who conducts, analyses, and proposes solutions to land use issues, not necessarily with an ecosystem focus.

2.365 Larva — An immature, often vermiform stage of an animal with indirect development (undergoes metamorphosis). Insects, Amphibians and a few other invertebrates have a larval stage in their development.

2.366 Larvivore — Any group of organisms which consumes larva as a food source.

2.367 Latent — The latent period of a pathogen is the time it requires to develop in the environment before it can cause infection.

2.368 Lateral — The side of the body of an animal.

2.369 Lateral Line — A series of sensory receptors along the sides of a fish.

2.370 Latrine — A community toilet.

2.371 Leachate — Liquid that has traveled through solid waste or other medium and has extracted dissolved or suspended material from it.

2.372 Leaching

a) The removal of soluble constituents from soils or other material by percolating liquid. It can also be termed as the removal of salts and alkali from soil matrix by abundant irrigation combined with drainage.
b) The disposal of a liquid through a non-watertight artificial structure, conduit, or porous material by downward or lateral drainage, or both, into the surrounding permeable soils.

2.373 Lentic

a) Standing waters such as lakes, ponds, and marshes.
b) Pertains to lakes or ponds or any body of standing water.

2.374 Lethal Concentration, Lethal Dose — The quantity of a substance that is fatal to 50 percent of the population on which it was tested after a given period of time.

2.375 Lethal Dose — The amount of a poisonous substance (toxic) which will kill an organism.

2.376 Life Cycle — The various stages an animal passes through from egg fertilization to death.

2.377 Life Expectancy — The average time an animal is expected to live after reaching a certain age.

2.378 Life Zone — Any series of bio–geographic zones into which a continent, region, etc., is divided both by latitude and altitude on the basis of the characteristic animals and plant life in a zone.

2.379 Limnetic — Pertaining to open waters of lakes.

2.380 Limnokrene — A lake or pond formed by a spring.

2.381 Limnology — That branch of hydrology relating to water of lakes and ponds.

2.382 Linkages — Characteristics of a landscape that provide direct physical connections between two or more places.

2.383 Liquid Limit — The water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil.

2.384 Liquid Waste — A general term denoting pollutants such as soap, chemicals or other substances in liquid form.

2.385 Litter — The uppermost organic materials partly or not at all decomposed on the surface of the soil.

2.386 Littoral

a) A zone of a lake or ocean in which light penetrates to the bottom.
b) Inhabiting bottom of sea or lake near shore, roughly within a depth to which light and wave action reach.

2.387 Loam — A detrital deposit consisting of nearly equal proportions of particles of the sand, silt and clay grade.

M

2.388 Macro Organisms — Organisms visible with the unaided eye.

2.389 Macrophytes — Large forms of vegetation.

2.390 Macroscopic — Visible with the unaided eye.

2.391 Marine — Pertaining to the ocean, sea or other bodies of salt water.

2.392 Marsh — Area of low lying wetland usually characterized by non-woody vegetation; it may be either fresh or salt water.

2.393 Maximum Allowable Concentration — The concentration of a pollutant considered (in regulations) harmless to healthy adults during their working hours, assuming that they are not in contact with the pollutant the rest of the time.

2.394 Maximum Contaminant Level — The maximum permissible level of a contaminant in water that is delivered to any user of a public water system.

2.395 Maximum Permissible Level — A general term covering the greatest degree of contamination that is permitted from any source.

2.396 Meromictic Lake

a) A lake in which dissolved substances create a gradient of density differences with depth that prevent complete mixing or circulation of water masses. Circulation is only in the upper layers.
b) A lake with incomplete circulation (mixing).

2.397 Mesotrophic — A naturally occurring or artificial (due to nutrient enrichment) condition intermediate between eutrophic and oligotrophic.

2.398 Mesotrophic Lake — A lake containing a moderate amount of plant nutrients.

2.399 Metabolism — The sum total of the chemical transformations (anabolism and catabolism) occurring in the body of a living organism.

2.400 Metalimnion — A zone of abrupt temperature change (thermocline) between the warm epilimnion and the cool hypolimnion of a lake.

2.401 Metamorphosis — The transformation of a larval form into an adult form.

2.402 Microaerophile — Microorganisms requiring oxygen in very low concentration for optimum growth.

2.403 Microbes — Microscopic living organisms, including bacteria, protozoa, viruses, and fungi.

2.404 Microbiota — The microscopic plants and animals of a given habitat.

2.405 Microorganisms — Organisms so small as to require magnification for observation.

2.406 Microphytes

a) A microscopic plant.
b) A plant dwarfed due to unfavorable environmental conditions.

2.407 Microscopic — Visible only with the aid of some magnifying device.

2.408 Migration — Moving from one locale to another particularly during a change of season.

2.409 Mineral Soils — Soils having less than approximately 20 percent (by mass) organic carbon.

2.410 Mineral Water — Water that contains a high quantity of mineral salts.

2.411 Minimum Flow — Negotiated lowest flow in a regulated stream that will sustain an aquatic population of agreed upon levels. This flow may vary seasonally.

2.412 Mitigate — To render or become mild or milder; to modify. To moderate or make or become less severe, violent, fierce, cruel, intense, harsh rigorous, painful, etc; to soften, appease, meliorate, diminish, lessen, temper.

2.413 Mitigation — To render or become mild or milder; to modify.

2.414 Mixing Layer — The zone separating regions occupied by two physically or chemically different fluids across that a gradient of the mixed fluid properties exists. Also called transition zone or zone of transition.

2.415 Monitoring — Periodic or continuous sampling to determine the level of pollutant or radioactivity present in the environment.

2.416 Monitoring Programme — A programme designed to measure, quantitatively or qualitatively, the level of a substance over a period of time.

2.417 Monitoring Well — A well used to obtain water samples for water quality analysis or to measure groundwater levels.

2.418 Monoculture — Cultivation of land in a single crop.

2.419 Mortality — Death rate of population.

N

2.420 Nanoplankton — Minute plankton, including algae, bacteria and protozoans of size 2 – 20 µm.

2.421 Necrosis — The localized death of living cells (as from infection or the interruption of blood supply); the process where localized tissue becomes infected.

2.422 Nocturnal — Active or functioning at night.

2.423 Non–point Pollution — Pollutants whose sources can not be pinpointed. Pollution from a widespread area.

2.424 Nutrient — A chemical compound (such as protein, fat, carbohydrate, vitamins, or minerals) or a substance that promotes growth.

2.425 Nymph — Immature form of an insect.

O

2.426 Oceanic — Inhabiting the sea where it is deeper than 200 m.

2.427 Oligomictic Lakes — Warm water lakes where water temperature is considerably higher than 4°C the year round.

2.428 Oligotrophic — Referring to a water body low in nutrient supplies. Such water bodies contain little organic matter; have a high dissolved oxygen level and low numbers of aquatic organisms.

2.429 Organic — Referring to or derived from living organisms. In chemistry, any compound containing carbon.

2.430 Organic Compound — A chemical compound containing the element carbon.

2.431 Organism — Any living thing.

2.432 Osmosis — The movement of a substance dissolved in a solution, through a semi permeable membrane, from a region of lower concentration to a region of higher concentration.

2.433 Ossified — Bone hardened by the deposition of mineral matter.

2.434 Outfall — The mouth of a sewer, drain or conduit where an effluent is discharged into receiving waters.

2.435 Outlet — Any channel into which water is diverted to aid land drainage.

2.436 Outlet Channel — A waterway or drainage channel provided to collect and carry away discharge.

2.437 Outwash — Mineral materials which have been carried and sorted by water from high to low elevations. This would include glacial outwash materials originally suspended in glaciers which have been moved and deposited by melted water.

2.438 Overturn — The complete circulation or mixing of the upper and lower waters of a lake when the temperatures (and densities) are similar.

2.439 Oxidation — Generally the addition of oxygen to a chemical species. The process by which electrons are removed from atoms or ions.

2.440 Oxygen Depletion — Removal or exhaustion of oxygen by chemical or biological use.

2.441 Oxygen Sag — A drop in oxygen concentration usually at night due to biological respiration.

2.442 Ozone Layer — The thin protective layer of gas 10 to 50 km above the earth that acts as a filter for ultraviolet (UV) radiation from the sun. High UV levels can lead to skin cancer and cataracts and affect the growth of plants.

P

2.443 Paddy — A specially irrigated or flooded field where rice is grown.

2.444 Parasite — An organism living in or on another organism at the expense of the latter.

2.445 Particulate Matter — Any material, except water in uncombined form, that is or has been airborne and exists as a liquid or a solid at standard conditions. Larger particles settle out of the air. However, the smaller particles (less than 1 µm) are readily respirable contributing significantly to respiratory disease and reducing visibility.

2.446 Pathogen — An organism capable of causing disease.

2.447 Pediments — Areas along the face of the uplifted mountain ranges which are relatively gently sloping and which have been formed by several factors including sheet erosion and deposition, stream braiding etc. The general slope of these areas is governed by the slope and erodibility of the underlying bedrock formations.

2.448 Pelagic — Pertaining to open water, generally the ocean.

2.449 Perched Water Table — The upper surface of a body of groundwater in a zone of saturation that is separated by unsaturated material from a body of groundwater below it.

2.450 Percolation Rate — The rate (in units of velocity) at which water flows from top soil to subsoil under specific conditions.

2.451 Perennial

a) A plant that lives for an indefinite period, dying back seasonally and producing new growth from a perennating part.
b) Flowing during all the year, for example, perennial stream, perennial canal.

2.452 Permeability — It is defined as the characteristic of a medium to transmit water.

2.453 Permeable Material — That which allows water to pass through easily.

2.454 Pervious — Capable of being penetrated through the pores (for example, sandstone).

2.455 Pest — Any insect, rodent, nematode, fungus, weed or any other form of terrestrial or aquatic plant or animal life or virus, bacteria or other microorganism that causes economic, social or psychological harm to humans or human endeavors.

2.456 Pesticide — Pesticides are chemical compounds used to rid an area of unwanted organisms such as weeds, insects, bacteria and fungi.

2.457 *p*H

a) At a given temperature the intensity of the acidic or basic character of a solution.
b) The *p*H value of an aqueous solution is the logarithm to the base 10 of the reciprocal of hydrogen ion concentration (expressed in g/l) of the solution. Distilled water, which is neutral, has *p*H value of 7.

2.458 Phenology — The study of recurring natural phenomena such as migration of animals, leafing of trees, blossoming of plants, etc. in relation to the seasons.

2.459 Photoperiodism — Response of plants and animals to relative duration of light and darkness.

2.460 Photosynthesis — The process by which chlorophyll containing plant cells use solar energy, carbon dioxide and water to produce carbohydrates.

2.461 Phreatophyte — A plant that draws its water supply from groundwater.

2.462 Physical Geographer — A geographically trained scientist oriented toward spatial description of physical features and natural resources. Generally the emphasis is toward physiography, geomorphology, or climatology.

2.463 Physiography — Branch of science that deals with the physical features of earth.

2.464 Plankton — Passively floating or weakly motile aquatic plants and animals ranging from 20 cm to < 0.2 µm, in size.

2.465 Pluvial

a) Of or pertaining to rain; and
b) Due to the action of rain.

2.466 Point Source — A highly localized pollutant source.

2.467 Poly Chlorinated Biphenyl (PCB) — Any of several organic compounds used in plastics manufacture, transformers and capacitors that are toxic and persistent environmental pollutants and tend to accumulate in animal tissues.

2.468 Pollutant — A contaminant which is present in excess of permissible limit and becomes harmful.

2.469 Pollution

a) The alteration of the physical, chemical, or biological properties of the atmosphere or any water supply including change in temperature, taste, color, turbidity, or odor, or the discharge of unnatural liquid, gas, solid, radioactive, or any other substance which is likely to create nuisance problem or render the air and/or water supply injurious to public health or safety or render the air and/or water supply detrimental to wild animals, birds, and fish or other aquatic life.
b) The presence of matter or energy whose nature, location or quantity produces undesirable environmental effects. Any other substance that is likely to create a nuisance problem or render the air and/or water supply injurious or detrimental to living organisms.

2.470 Pollution Load — The quantity of material in a waste stream that requires treatment or exerts an adverse effect on the receiving system.

2.471 Pollution Plume — The trace or path of leachate or other pollutant substances, moving along the flow paths of groundwater or in surface water.

2.472 Polymictic — A lake that shows continuous mixing at temperatures just over 4 degree centigrade and stratification does not develop in it.

2.473 Pond — A small lake.

2.474 Ponded Water — Water that remains on the soil surface when the soil is saturated.

2.475 Population — An interbreeding group of plants or animals; the entire group of organisms of one species (as used in ecology).

2.476 Population Density — The number of individuals of a population per unit area or volume.

2.477 Porosity — Porosity is an index of the void characteristics of a soil or stratum as pertaining to percolation. It is the ratio, usually expressed as percentage, of the volume of voids of a given soil mass to the total volume of soil mass.

2.478 Portable — Easily or conveniently transported.

2.479 Potable Water — Water that does not contain objectionable pollution, contamination, minerals, or infectious agents, and is considered satisfactory for human consumption.

2.480 Potamology — The scientific study of the chemical, physical, geological and biological nature of lotic environment.

2.481 Potential Evapotranspiration — The amount of water that could pass into the atmosphere by evapotranspiration if the amount of soil water were not a limiting factor.

2.482 Precipitate — A solid that separates from a solution because of some chemical or physical change.

2.483 Predator — An animal that feeds on other animals but is not a parasite.

2.484 Pretreatment Processes — Processes used to reduce the amount of pollution in water before it enters the sewers or the treatment plant.

2.485 Prey — An animal hunted or killed and used as a food source by another animal.

2.486 Pristine State — A state of nature without or with negligible human interference.

2.487 Profundal — Deepest part of the ocean or lake where light does not penetrate, characteristically it is low in nutrients, has few organisms as compared with the surface.

2.488 Protected Species — Any species whose existence may be in jeopardy and in need of special protection throughout all or a portion of its range.

2.489 Protozoa — Single celled animals which inhabit fresh water, salt water and soils.

2.490 Pupa — The non–feeding stage in an insect's development between larva and adult (plural pupae).

2.491 Purification — The removal of objectionable matter (chemical substances, living organisms and physical properties) from water by natural or artificial methods.

R

2.492 Rain Forest — A tropical forest having an annual rainfall of at least 2540 mm.

2.493 Receiving Waters — Rivers, lakes, oceans or other water bodies that receive treated or untreated wastewater.

2.494 Reclaimed Water — Water that has undergone such treatment so as to make it suitable for a direct beneficial use.

2.495 Reforestation — To restock otherwise felled or cleared woodland.

2.496 Rehabilitation — The restoration of people or a degraded natural resource to the former status or capacity.

2.497 Remote Sensing — The technique of deriving information about the earth's surface from images acquired from a distance, using airborne equipment installed in an aircraft or satellite.

2.498 Reservoir

a) A pond, lake, basin or other space, either natural in its origin or created in whole or in part by building of engineering structures, which is used for storage, regulation and control of water. Small reservoirs are also called tanks.
b) An extra supply of any thing, as a reservoir of infection etc.

2.499 Reservoir Capacity — Capacity of the reservoir to hold water in it.

2.500 Residue — The material that remains after completion of a chemical or physical process such as combustion, distillation, evaporation or filtration.

2.501 Resilience — The ability of any system to recover from or to resist being affected by a shock, stress or disturbance.

2.502 Resource — A tangible product of the earth or biosphere capable of serving, supplying, or supporting some human purpose or need.

2.503 Resource Conservation — Reduction of the amounts of solid waste that are generated, reduction of overall resource consumption and utilization of recovered resources.

2.504 Resource Management — The introduction and enforcement of restraints, including specified technical practices, to safeguard the future of renewable resources and uphold the principle of sustained yield.

2.505 Respiration — Commonly breathing; in biology the oxidative breakdown of food molecules of cells with the release of energy. The complex series of chemical and physical reactions in living things by which energy and nutrients are made available for use. Oxygen is used and carbon dioxide released during the process.

2.506 Retention Dams — Small earthen dams designed to retain water for only short periods of time to prevent excessively rapid runoff and erosion.

2.507 Return Flow — That portion of water previously diverted from a stream and subsequently returned to that stream or to another body of ground or surface water.

2.508 Reuse — The planned and deliberate use of treated wastewater for some beneficial purpose, such as irrigation, recreation, industry, recharging of underground aquifers, and drinking.

2.509 Riparian — Pertaining to banks of a stream or body of water, for example, 'riparian rights' are natural rights due to the proprietor of lands along the river banks.

2.510 River Basin — The portion of land drained by a river and the streams that flow into it. The quality of a river basin affects the quality of water, so efforts to protect and improve water quality must often include plans for managing river basins.

2.511 Riverine — Riparian; pertaining to a riverbank.

2.512 Rivulet, **Runnel** — A small stream.

2.513 Rock Permeability — The capacity of a rock (or soil) to transmit water specified as a velocity (for example cm/h)

2.514 Runoff — It is defined as that portion of the precipitation which is not absorbed by the deep strata but finds its way into the streams after meeting the persistent demands of evapo–transpiration including interception and other losses. It includes surface run off received into the channels after rainfall, delayed run off that enters the streams after passing through portion of the earth, and other delayed run off that has been temporarily detained as snow cover or stored in natural lakes or swamps.

S

2.515 Saline

a) Relating to or containing salt.
b) Water containing dissolved salts, usually at concentrations from 10 000 to 33 000 mg/l.

2.516 Saline Alkaline Water — Water which has moderate concentration of soluble sodium salts.

2.517 Saline Water — Water which contains moderate concentration of total dissolved salts.

2.518 Salinisation — Excess accumulation of salt.

2.519 Salt Balance — The salt balance of an irrigated area is commonly defined as the difference between the total dissolved solids brought to the land annually by the irrigation water and by seepage water and the total solids carried away annually by the drainage water and by seepage water.

2.520 Salt Index — A formula for ascertaining whether water suitable for irrigation is:

$$\text{Salt Index} = (\text{Total Na} - 24.5)\ [\text{Total Ca} - \text{Ca in } \{CaCO_3^{+} + Ca\,(HC\,O_3)_2\} \times 4.85]$$

All quantities in the formula refer to parts per million. The salt index is negative for all good waters and positive for those unsuitable for irrigation.

2.521 Salt Water Intrusion — The movement of saltwater inland into subterranean aquifers.

2.522 Sanctuary — An area usually set aside by legislation or deed to observe restriction for the preservation and protection of organisms.

2.523 Sand — Mineral particles whose effective diameters lie in the range 0.02 – 2.0 mm.

2.524 Saprophyte — An organism that obtains nutrition from dead organic matter.

2.525 Seasonality — Phenomena that shows cyclic or repeated behaviour according to the season.

2.526 Secchi Disc — Black and white disc used to visually measure light penetration through water.

2.527 Secondary Pollutant — A pollutant formed by the combination or reaction of other primary pollutants.

2.528 Sediment

a) Fragmental material transported by, suspended in or deposited by a flowing channel without any regard to size.
b) Usually finely divided organic and / or mineral matter deposited by air or water in non turbulent areas.

2.529 Sedimentation — The process of deposition and subsidence of suspended matter carried by water, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point where it can transport the suspended material.

2.530 Seepage

a) Slow percolation generally associated with flow in an unsaturated medium. Seepage into a body is termed 'influent seepage' and that away from a body as 'effluent seepage'. The difference between percolation and seepage is that the latter is through unsaturated material while the former is through saturated material.
b) Movement of water through pores and interstices of unsaturated packed soil material into or out of a surface or subsurface body of water, such as river, canal, reservoir, etc.

2.531 Seismicity — The phenomenon of earth movements or seismic activity.

2.532 Self Purification, or Natural Purification — The general tendency of a body of water to recover naturally from contamination by organic wastes.

2.533 Semi Confined Aquifer — An aquifer that has a semi– confining rock formation above it.

2.534 Semi Confining Rock Formation — A rock formation that is capping an aquifer that is not totally impermeable.

2.535 Semi Desert — A region with conditions less harsh (some rainfall) than in a desert.

2.536 Septic — Referring to the presence of disease producing bacteria or other micro– organisms.

2.537 Septic Tank — A water tight sedimentation tank for sewage in which the sludge settling on the bottom is allowed to digest and liquefy by anaerobic bacterial action. The liquid effluent may be passed from the tank into the ground, or into a seepage tank in which it is filtered through sand or gravel before release.

2.538 Seston — Minute living organisms and particles of non living matter which float in water and contribute to turbidity.

2.539 Sewage — Liquid wastes from communities, which may be a mixture of domestic effluent from homes and liquid waste from industry.

2.540 Sewage Effluent — The liquid and solid waste carried off with water in sewers or drains.

2.541 Sheet Flow — Flow of water across the whole soil surface.

2.542 Shrub — A woody perennial of smaller height than a tree.

2.543 Silt — A general name for muddy deposit of fine sediment.

2.544 Siltation — Referring to the deposition of silt sized (smaller than sand sized) particles.

2.545 Silva — A treatise or description of trees of a given area.

2.546 Site — An area of land large enough to be mapped with specific soil characteristics such as water holding capacity and available nutrients.

2.547 Slurry — A watery mixture of insoluble matter pumped to form an impervious barrier beneath a dam to impede seepage.

2.548 Smog — Air pollution consisting of smoke and fog, which occurs in large urban and industrial areas and is mainly caused by the action of sunlight on burned fuels, mostly from car exhausts. Smog can cause eye irritations and breathing problems and damage plant life.

2.549 Sodium Adsorption Ratio (SAR) — A ratio for soil extracts and irrigation waters used to express the relative activity of sodium ions in exchange reaction with soil;

$$\mathrm{SAR} = \frac{\mathrm{Na}^{+}}{\sqrt{\dfrac{\mathrm{Ca}^{++} + \mathrm{Mg}^{++}}{2}}}$$

where, the ionic concentrations are expressed in, milliequivalents/liter.

2.550 Soft Water — Water with less than 17.0 mg/l of calcium and magnesium carbonates.

2.551 Soil Aeration — Movement of air into the soil as water is drained out; process by which air and other gases in the soil are renewed.

2.552 Soil Aggregation — The lumping together of soil particles into a coherent mass.

2.553 Soil *p*H — A measure of how acidic or basic, a given soil is, determined by measurement on the saturated paste, or the saturated extract, of the samples of the soil in question.

2.554 Soil Pores — Air spaces in the soil.

a) Macropores: diameters >0.05 mm and visible to the naked eye;

b) Mesopores : diameters between 0.002 – 0.05 mm; and

c) Micropores; diameters < 0.002 mm.

2.555 Soil Porosity — Percentage of soil volume not occupied by solids, including all the pore space filled with air and water.

2.556 Soil Salinization — Detrimental process through which the concentration of soluble salts in a soil can increase as water is removed from the soil by evaporation and transpiration.

2.557 Soil Structure — The combination or arrangement of primary soil particles into aggregates (or peds) which, together with the associated pore spaces, constitutes the physical framework of the soil,

2.558 Soil Texture — Refers to the relative proportions of the various size groups (sand, silt and clay) of the individual soil grains in a mass of soil.

2.559 Soil Water Deficit — The quantity of water required (mm) to restore the moisture content of a soil to field capacity.

2.560 Soil Water Tension

a) The pressure (negative) or suction of the liquid phase in an unsaturated soil.

b) The force per unit area that must be exerted to remove water from the soil.

2.561 Solute — A substance dissolved in another substance usually the component of a solution present in the lesser amount.

2.562 Spawn — To produce or deposit eggs or discharge sperm; applied to aquatic animals.

2.563 Spawning Beds — Those places in which the eggs of aquatic animals lodge or are placed during or after fertilization.

2.564 Species

a) Groups of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups.

b) The basic unit of biological classification.

2.565 Species Density — The number of individuals of any given species per unit area at any given time.

2.566 Specific Yield — The quantity of water that a unit volume of permeable rock or soil, will yield when drained by gravity, after being saturated. It may be expressed as a ratio or as a percentage by volume. The sum of specific retention and specific yield equals the porosity of the material drained. (This definition is different from that of surface water.)

2.567 Spillway — A waterway in a dam or other hydraulic structures for the escape of flood/excess water.

2.568 Spleen Index — The proportion of a population with a clinically palpable spleen and used as a measure of malarial endemicity.

2.569 Sporadic — Widely scattered biological form.

2.570 Spring — A concentrated natural discharge of groundwater appearing at the surface as a current of flowing water.

2.571 Stability (Ecological) — The tendency of systems, especially ecosystems, to persist relatively unchanged through time; also, persistence of a component of a system.

2.572 Static Head — The height, relative to an arbitrary reference, level or a column of water that can be supported by the static pressure at a given point.

2.573 Storm Water Runoff

a) The runoff, or stream flow, is the water that is gathered into rivulets brooks, and rivers. The water that is derived directly from precipitation and passes over the ground into water courses is known as the surface, storm, or flood runoff.

b) The flood waters that descend the water courses of a drainage basin or that collected by the storm drains or combined sewers of a municipal drainage district derived from the rains that fall upon the tributary watershed.

2.574 Stratification/Density Stratification — The existence or formation of distinct layers identified by differences in temperature, salinity, or oxygen or nutrient content. Lakes usually have three layers of varying temperature epilimnion, metalimnion and the hypolimnion.

2.575 Stratified Flow — A condition that occurs when water of a given density flows under, over, or around a mass of water of a different density. Examples of such flow are Heavier inflowing water such as that of a cold or turbid stream which may flow under less dense water in a lake or a reservoir; and Fresh water, being less dense, may flow over heavier saline water.

2.576 Stratigraphy (Geological) — The study of rock strata or rock layers.

2.577 Stream Load — All rock fragments and dissolved substances from rocks moved along in the stream water.

2.578 Stream Restoration — Various techniques used to replicate the hydrological, morphological and ecological features that have been lost in a stream due to urbanization farming or other disturbance.

2.579 Stress — The result of consequent state of a physical or chemical or social stimulus on an organism or system; properly, a state of strain.

2.580 Sub–species — A sub–division of a species forming a group whose members resemble each other in certain characteristics, and differ from other members of the species, though there may be no sharp dividing line.

2.581 Sullage — Domestic dirty water not containing excreta, also called grey water.

2.582 Surface Irrigation — Application of water to the soil surface via furrows, border strips, basins or by wild flooding.

2.583 Surface Water — Water that flows exclusively across the surface of the land from the point of application to point of discharge.

2.584 Suspended Solids — Particulate matter in water that can be removed by filtration.

2.585 Sustainable Development — Development using land or energy sources in a way that meets the needs of people today without reducing the ability of future generations to meet their own needs.

2.586 Swamp — A flat, wet area usually or periodically covered by standing water and supporting a growth of trees, shrubs and grasses in contrast to a bog, the organic soil is thin and readily permeated by roots and nutrients.

T

2.587 TDS — Acronym *See* total dissolved solids.

2.588 Terms — Definition

2.589 Terrain (or Terrane) — A tract of land or its physical features with special emphasis on bedrock geology.

2.590 Terrestrial — Not aquatic, refers to the land.

2.591 Territory — An area over which an animal or group of animals establishes jurisdiction.

2.592 Thermocline, Mesolimnion, Metalimnion — A thin horizontal zone of water in lakes and oceans with a steep temperature gradient, separating a warm surface layer (epilimnion) from a cooler bottom layer (hypolimnion).

2.593 Thermophilic — Requiring high temperatures (above 45 degree centigrade) for optimum growth.

2.594 Tolerance — An organism's capacity to endure and adapt to unfavorable environmental factors.

2.595 Topography — The physical shape of the ground surface.

2.596 Total Dissolved Solids (TDS)

a) An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc. of calcium, magnesium, sodium, potassium, and other cations which form salts.

b) The concentration of dissolved mineral constituents in water, commonly expressed in parts per million (by mass) or mass per unit volume.

2.597 Total Irrigation — Irrigation that supplies all the water needs of plants.

2.598 Toxic — Poisonous or harmful to the body (ecotoxic relates to damage to the environment).

2.599 Toxicity — The degree of danger posed by a substance to animal or plant life.

2.600 Toxin — A poisonous substance that can either be natural (produced by plants, animals or bacteria) or manufactured.

2.601 Trace Elements — A chemical present in a minor amount.

2.602 Transient Species — A species that migrates through a locality without breeding or overwintering.

2.603 Translucent — Transmitting but diffusing light so that objects beyond cannot be clearly seen.

2.604 Transpiration — The process by which plants dissipate water from their leaf and body surfaces in the phenomena of growth.

2.605 Treatment — Any method, technique or process including neutralization designed to change the physical, chemical or biological character or composition of any hazardous waste so as to neutralize such waste or so as to recover energy or material resources from the waste, or so as to render such waste non hazardous or less hazardous; safer to transport, store, dispose off; or amendable to recovery, storage or reduction in volume.

2.606 Treatment (Wastewater) — Domestic sewage can be treated to reduce pollutants in three ways; each way can be followed by disinfection, if necessary.

2.607 Tree Limit or Tree Line — The altitude in mountains or in the southern or northern latitudes where only isolated trees grow and beyond which only stunted forms occur.

2.608 Trickle Irrigation, Drip Irrigation — Irrigation by means of pipe (usually plastic) that is perforated, porous or filled with emitters, so that water is applied at very slow rates to the soil near each irrigated plant. Such pipes can be buried or hung from trellises, not necessarily along the ground.

2.609 Trophic — Refers to nutrition.

2.610 Trophic Level — Place of an animal in the food chain.

2.611 Tsunami — A tsunami is a series of water waves caused by the displacement of a large volume of a body of water, typically an ocean or a large lake due mainly due to earthquakes, volcanic eruptions and other underwater explosions.

2.612 Turbidity — Reduction of transparency of water due to presence of suspended particles. It is evaluated by comparison with standard suspension in a standard light intensity and expressed in terms of concentration of the material used in standard suspension, commonly silica or mg (silica)/litre. Alternatively it may also be expressed in terms of mg/l or parts per million of the suspended material present in the actual water sample.

2.613 Turnover (Lake) — *See* overturn.

2.614 Type Specimen — The original specimen from which a description of a new species is made. When the exact specimen is not known or is lost, the one selected to replace it is called the lectotype or neotype.

U

2.615 Unavailable Water — Water in the soil that is not available for use by plants because it is held by such high tensions by the soil particles.

2.616 Unconfined Aquifers — An aquifer in which the groundwater table is free to rise and fall according to hydraulic gradients.

2.617 Underdrainage — Removal of excess water from the soil by a subsurface system of drainage.

2.618 Undergrowth

a) Collectively, the shrubs, sprouts, seedlings, and sapling trees and all herbaceous plants in a forest.

b) The shrubs, sprouts, seedlings and sapling trees and all herbaceous plants in a forest.

V

2.619 Vascular — Refers to vessels or ducts that conduct fluids in organisms.

2.620 Vector — An organism that carries a disease, parasite, or infection.

2.621 Vector Control — Process of controlling a disease, parasite or infection by control of the carrier.

2.622 Vertebrate — Animals which have backbones or vertebral columns.

2.623 Virus — Ultramicroscopic, obligate intracellular parasites whose genetic material consists of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) but never both within the same cell.

2.624 Volatiles — Material that pass into a gaseous state at ordinary temperatures and pressures; substances that readily move or have moved through the earth's atmosphere.

2.625 Virtual Water Content — The virtual water content of a product is the freshwater embodied in the product, not in real sense, but in virtual sense. It refers to the volume of water consumed or polluted for producing the product, measured over its full production chain. If a nation exports/imports such a product, it exports/imports water in virtual form.

W

2.626 Waste

a) Refuse from places of human or animal habitation; a solid, liquid, or gaseous by product derived from human activities.

b) Any substance, solid, liquid, or gaseous, for which no use can be found by the organisms or system that produces it, and for which a method of disposal must be devised.

2.627 Waste Load Allocation Study — A study involving monitoring and calculations based on model and the monitoring data to determine the total maximum daily load for a segment's stream.

2.628 Water logging

a) A phenomenon where water stands near, at, or above the land surface causing damage to plant roots.

b) The saturation of soils with water like the soaking of agricultural land caused by a rising water table or excessive irrigation. It compacts soil, deprives roots of oxygen and contributes to salinization.

2.629 Waste Management — The term describing a comprehensive, integrated, and rational system approach towards the achievement and maintenance of acceptable environmental quality.

2.630 Waste Treatment — Any process to which wastewater or industrial waste is subjected, to make it suitable for subsequent use.

2.631 Waste Water

a) Water carrying dissolved or suspended solids from homes, farms, businesses and industries.

b) Water derived from a municipal or industrial waste treatment plant.

2.632 Waste Water Reclamation, Waste Water Treatment — Processing of wastewater for reuse.

2.633 Water Pollution — The addition of harmful or objectionable material causing an alteration of water quality.

2.634 Water Pollution Level — Degree of pollution of the run-off flow, measured as the fraction of the waste assimilation capacity of runoff actually consumed. A water pollution level of 100 percent means the waste assimilation capacity of the runoff flow has been fully consumed.

2.635 Water Quality — The chemical, physical, and biological characteristics of water, with respect to its suitability for a particular purpose.

2.636 Water Quality Criteria — Upper limits on dissolved or suspended constituents of water as set by a regulatory agency that govern the water suitability for a designated use. The constituents might include, dissolved solids, turbidity, pesticides, micro– organisms etc.

2.637 Water Quality Management — The plan for managing the water quality.

2.638 Water Quality Standards — Specific limits assigned to a substance or characteristic in a water which must be maintained if the water is to be suitable for the use designated for it by the water use classification.

2.639 Watershed — The entire drainage area that contributes water to a system; the line of separation between adjacent water catchment areas.

2.640 Water Table — The upper surface of a zone of saturation except where the surface is formed by an impervious body. No water table exists where the upper surface of a zone of saturation is formed by an impermeable body.

2.641 Weed — A plant considered undesirable, unattractive or troublesome, especially growing where it is not wanted like in cultivated ground/water body.

2.642 Wetland

a) Wetlands are areas of marsh, fen, peat land or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water.

b) An area of land that has hydric soil and hydrophytic vegetation, typically flooded for part of the year and forming a transition zone between aquatic and terrestrial ecosystem.

2.643 Wildlife — Living organisms that are not in any way artificial or domesticated and which exist in natural habitats. Commonly refers to fauna that is, mammals, birds, reptiles, amphibians and insects, living in a natural environment.

2.644 Wildlife Habitat — Suitable upland or wetland areas promoting survival of wildlife.

2.645 Worm Load — The number of parasitic worms with which a person is infected.

Z

2.646 Zero Emissions — An engine, motor or other energy source that does not produce any gas or release any harmful gases directly into the environment.

2.647 Zero Liquid Discharge — Zero Liquid Discharge process is the most advanced waste water treatment technology that recycle and purify the produced waste water. This process is highly advantageous for different industries and municipal corporations for effectively reusing their waste water and effluent to achieve zero liquid discharge. The process is cost effective, environment friendly and no effluent or discharge is left.

2.648 Zoology — The study of all aspects of animal life.

2.649 Zooplankton — Free swimming or floating animal plankton.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Composition of Environmental Assessment and Management of Water Resource Projects
Sectional Committee WRD 24

Organization	*Representative(s)*
Central Water Commission, New Delhi	Shri Amrendra Kumar Singh (***Chairman***)
AIIMS Rishikesh, Rishikesh	Dr Surekha Kishore
Alternate Hydro Energy Centre Indian Institute of Technology, Roorkee	Prof Arun Kumar Prof M. K. Singhal (*Alternate*)
Central Board of Irrigation & Power, New Delhi	Dr G. P. Patel Shri Uday Chander (*Alternate*)
Central Ground Water Board, New Delhi	Shri G. C. Pati Srimati Rumi Mukherjee (*Alternate*)
Central Pollution Control Board, New Delhi	Shri R. M. Bhardwaj Shri N. C. Durgapal (*Alternate*)
Central Water Commission, New Delhi	Shri B. B. Saikia Deputy. Director (EM) (*Alternate*)
Cetus Consulting Solution Services Pvt. Ltd, New Delhi	Dr Ajay Pradhan Dr Vivek Kumar Singh (*Alternate* I) Principal Scientist (*Alternate* II)
Forest Survey of India, Dehradun	Shri Abhay Kumar Saxena
Geological Survey of India, Kolkata	Dr K. Jayabalan Deputy Director General (*Alternate*)
ICAR – Central Inland Fisheries Research Institute, Kolkata	Dr B. K. Das
India Water Partnership, Gurugram	Dr Veena Khanduri
Indian Institute of Technology Roorkee, Roorkee	Dr Surendra Kumar Mishra
IRG Systems South Asia Pvt Limited, New Delhi	Shri Amit Jain Shri Krishna Kumar (*Alternate*)
Maharashtra Engineering Research Institute, Nashik	Superintending Engineer Executive Engineer (*Alternate*)
Maulana Azad Medical College, New Delhi	Dr Nandini Sharma Dr S. Kerketta (*Alternate*)
Ministry of Environment & Forests, New Delhi	Dr Mohit Saxena Deputy Director (*Alternate*)
Mu Gamma Consultants Pvt Ltd, Gurugram	Dr Girija K. Bharat Ms Avanti Roy Basu (*Alternate*)
Narmada Control Authority, Indore	Shrimati Usha Dwivedi
Narmada Water Resources and Water Supply Department, Gandhi Nagar	Shri V. P. Kapadia
National Institute of Hydrology, Roorkee	Dr C. K. Jain Dr Pradeep Kumar (*Alternate*)
National Water Development Agency, New Delhi	Shri R. K. Jain Shri Muzaffar Ahmad (*Alternate*)

Organization	*Representative(s)*
NHPC Limited, Faridabad	Shri Gaurav Kumar Shri Ashis Kumar Das (*Alternate* I) Ms Shreya (*Alternate* II)
North Eastern Regional Institute of Water and Land Management, Assam, Tezpur	Prof Amulya Ch Debnath Dr Uzzal Mani Hazarika (*Alternate*)
NTPC Limited, Noida	Dr Vijay Prakash Dr D. L. Nandeshwar (*Alternate*)
Regional Remote Sensing Centre-East Under National Remote Sensing Centre, Hyderabad	Dr S. Bandopadhyay Dr V. M. Chowdary (*Alternate*)
RS Environlink Technologies Pvt Ltd, Gurugram	Dr Arun Bhaskar
Soil & Land Use Survey of India, Delhi	Shrimati Rajni Taneja Shri Ravindra Kulkarni (*Alternate*)
TERI School of Advanced Studies, New Delhi	Dr Vinay Shankar Prasad Sinha Shrimati Ranjana Ray Chaudhari (*Alternate*)
THDC (India) Limited, Rishikesh	Dr D. L. Bhatt Shri Suraj Agarwal (*Alternate*)
University School of Environment Management, GGSIP University, Delhi	Dr Deeksha Katyal
Wapcos, Gurugram	Dr Aman Sharma Shri A. Stephen Leo (*Alternate*)
In personal capacity (*A-66, Vrindavan Apartment, Plot No. 1, Sector-6, Dwarka, New Delhi*)	Er R. K. Khanna
In Personal Capacity (*Jawaharlal Nehru University, New Mehrauli Road, New Delhi*)	Dr A. L. Ramanathan
In personal capacity, (*Dept of Sociology, Maitreyi College, Delhi University South Campus, D-104, Anand Niketan, New Delhi*)	Dr M. Kapur Shankar Dass
BIS Directorate General	Scientist 'F' and Head (WRD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Alok Singh
Scientist 'E' (WRD), BIS

This page has been intentionally left blank

This page has been intentionally left blank

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: WRD 24 (10944).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices: *Telephones*

Central : 601/A, Konnectus Tower-1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002 — 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091 — 2367 0012, 2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg Chandigarh 160019 — 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113 — 2254 1442, 2254 1216

Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093 — 2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi